United States Department of Agriculture

NRCS Natural Resources Conservation Service

Soil Data Delivery And Distribution

Draft Requirements Statement

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Acknowledgments

This report is the result of the cumulative effort of the following principal contributors.

USDA - Natural Resources Conservation Service
Soil Survey Division
Washington, D.C.

Information Technology Center
Fort Collins, Colorado

Executive Sponsor: Horace Smith, Director, Soil Survey Division
Sponsor Representative: Russ Kelsea, National Leader, Soil Survey Technical Services
Application Analyst: Gary Spivak
Business Analysts:

- Terry L. Aho
- David McMillen
- Jennifer Sweet
- Curtis Talbot
- Rick Bigler
- Eric Winthers (USFS)

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1 Perspective

1.1 Purpose

The purpose of the Draft Requirement Statement (DRS) is to state the known ways in which soil survey data are used in USDA programs, by partner agencies, and the general public. The DRS describes the existing systems of delivery and use of soil survey data, the limitations in the existing systems, and the fundamental business requirements for delivery and distribution of soil survey data.

This document does not explore the requirements for the collection and management of soil survey data and information or attempt to re-engineer any business process for the creation of the products and services delivered to customers.

1.2 Background

Soil survey for most of its history delivered soil survey data and information by creating static bound published soil survey reports. The soil inventory data collected during the soil survey are often filed and archived in hard copy paper form. These data are basically unavailable after completion of the soil survey. In many cases these data have been lost forever. In the late 1970's and early 1980's an automated database information system was used to record aggregated component information to describe soil map units in the legend of the soil survey area. These data became part of the State Soil Survey Database (SSSD) and was managed at the local NRCS state office. Electronic data from SSSD could periodically be exported and delivered to customers and products (FOCS and SSURGO) and used to create the bound published soil survey report.

The supporting data such as soil pedon descriptions, field notes, and soil map sheets are generally still managed as hard copy data sources and filed in the local office. Again these data are basically unavailable and in many cases have been lost forever. Some pedon descriptions and field notes are stored in NASIS. Approximately 90,000 pedon records have been converted from the obsolete Pedon 3.x database to NASIS.

Currently, soil survey data are managed in several independent systems: NASIS database for management and storing of aggregated mapunit data and soil profile descriptions; SOI-232 soil profile descriptions form; field notes collected on paper filed in the project office; analog and digital soil maps with polygons and point references; or other cooperators database's such as the Forest Service Natural Resource Information System (NRIS) – Terra database. Soil characterization data (lab) representing the sampled

and measured physical and chemical properties are utilized as reported results in the analysis and management of aggregated mapunit and classification of soil series concepts. Aerial photographs used for recording field observations and locations of soil mapunit delineations are the source for soil map products. Analog soil maps are used in preparation of published soil map sheets and in the creation of digital soil maps used in SSURGO and STATSGO. The delivery of soil survey data, information, and products are from all these systems. These systems are used both for the collection and management as well as the delivery of soil survey data. This makes it difficult or nearly impossible to manage and deliver a set of quality and consistent official data.

1.3 Objectives

The objective of the NRCS Soil Survey Division is to deliver consistent official soil survey data of high quality to meet our National Program responsibility and product delivery that meets our user needs. The DRS for soil data delivery and distribution provides the information needed to design a system that meets these objectives.

2 Background Summary

2.1 General

This report is a culmination of analysis work that began in early 1990. Information was gathered from several existing documents and interviews with product subject matter experts, NCSS cooperators, NRCS employees and user groups.

Existing documents used:

- Draft Requirements Statement – National Soils Information System, Interpretation and Information Dissemination (January 25, 1991).
- Draft Requirements Statement - National Soil Data Access Facility (April 12, 1993).
- Draft Requirements Statement – NRCS Soil Survey Data Access Map Unit Data (July 25, 1997).
- Technical Soil Service Analysis Document (November 1, 1999).
- Detailed Study Report – Issues Related to Data Distribution and the Soil Data Warehouse (April 25, 2000).
- RAD Analysis – Soil Data Warehouse, FOTG and NRI (December 13, 2000).
- Summary Report – Soil Survey Town Hall Meetings (Issued 2001).

User groups interviewed:

- NCSS cooperators (USFS, BLM, BIA, Military, NPS).
- Soil Scientists (project and technical soil services).

- Local units of governments (state, county, taxing authorities).
- Research (NSSL, university, ARS, Institutes –GLTI, SQI).
- Public (landowners and educators).

2.2 Analysis considerations

The Draft Requirements Statement for the delivery and distribution of soil data and information was developed with the constraint of completing the document by the beginning of fiscal year 2002 in anticipation of budget approval to begin design of a delivery system to meet the Soil Survey Division objectives.

The gathering of requirements for delivery and distribution of soil data and information was conducted over a period of 4 weeks. The analysis team recognized that doing a complete analysis in the limited time available would be nearly impossible. The analysis focused on utilizing existing documentation describing business requirements and targeting the interview of product subject experts and users that represented the highest priority for the Soil Survey Division. Priority was based on meeting our national program responsibility and our primary customers. The analysis team expects to capture the majority of the fundamental requirements for delivery of soil data and information.

There is always a chance that a unique requirement may not be captured during this analysis. Additional requirements and more detail will be added during the completion of the Total Requirements Statement.

2.3 Management considerations

The Draft Requirements Statement identifies the known ways in which soil survey data are used in USDA programs, by partner agencies and the general public. The requirements described provide a comprehensive view of the capabilities required for the delivery and distribution of soil survey data. The following are the next system development life cycle steps and management considerations for an implementation of an information system for the delivery and distribution of soil survey data.

2.3.1 Outline Physical Design

After the approval of the Soil Survey Data Delivery and Distribution Draft Requirement Statement the next step will be the Outline Physical Design (OPD), a document describing implementation scenarios with considerations of system and business constraints, budgets, schedules and management priorities and objectives. The system analyst and business area specialist at the Information Technology Center at Fort Collins, CO (ITC) in cooperation with National Cartography and Geospatial Center at Fort Worth, TX (NCGC) and National Soil

Survey Center at Lincoln, NE (NSSC) will develop the OPD. The OPD will be presented to Soil Survey Division for review and approval by early December 2001.

2.3.2 Total Requirements Statement

With the completion of the OPD work can begin on assembling an initial draft of the Total Requirements Statement (TRS). The Total Requirements Statement describes in specific details the system capabilities and functions that meet the business requirements. This will require additional detail to fully clarify the meaning of requirements. The ITC system analyst and business area specialist in cooperation with NCGC and NSSC will assemble the TRS and present it to Soil Survey Division for review and approval by March 2002. In March 2002 the design and implementation phase can begin.

2.3.3 Changes in Policy, Standards, and Business Practices

Implementation options and business compromises will be uncovered during the completion of the Outline Physical Design and Total Requirements Statement. Management will approve acceptable options and compromises. The design of a system will also expose potential changes that management needs to consider in policies, standards and business practices. This might include such things as changes in policy for delivery of official soil survey data from a single source or management procedures for changes in soil survey data and product formats.

2.3.4 Priority Requirements

Implementing a design may require a phased approach due to budget and resource availability. If a phased approach is used management will need to approve which functionality meets the agencies high priorities for data delivery. Section 8 is a priority listing of the fundamental requirements.

2.3.5 System Development Milestones

With the completion of the Draft Requirement Statement the next milestones in the development of an information system for the delivery and distribution of soil survey data are shown in the following table.

Milestone	**Target Date**
Outline Physical Design	December 2001
Budget Clarity/Allocation	January 2002
Total Requirements Statement	March 2002

Design and Initial Implementation Phase	March – September 2002
State Soil Scientist Certify and Deliver Official Data	October – December 2002

The key element that influences the development and schedule of an information system for the delivery and distribution of soil data is the timing and amount of budget resources allocated for design and implementation. An initial draft of the Outline Physical Design will be based on estimates of the potential 2002 budget including budget variation scenarios. The Total Requirements Statement will be completed targeting priority and dependent requirements that match resource availability for a potential design and implementation. Budget constraints will drive the final design and phased implementation of the soil delivery and distribution information system.

3 Definition of Terms

3.1 General

The definitions of terms apply to the usage in this document. Many terms used in this document may have different meanings when used in other contexts.

- **Certifying Data –** The process conducted by the State Soil Scientist to review and certify soil data for use by field offices and general public. The state soil scientist can partially certify the data for use for specific application such as RUSLE, WEPS, Hydric rating, etc.
- **Official Data -** The Official Copy of soil survey information is the most current soil information for a soil survey area that is certified for official use within the Field Office Technical Guide by the State Soil Scientist (GM Title 430, Part 402.5). Official data to be used for a specific purpose can vary depending on the application or use. For example the official data for the development of a new conservation plan is the current official data. The official data to be used with some National Program evaluations is the 1990 frozen data. The official data cited by specific county land use plan may be an archived dated version of the soil survey.
- **Most Up-To-Date Data -** Soil data that is most current. It may still be under development and testing (NASIS transactional database) and not yet been officially released for use.
- **Access -** A user can get the available soil survey data and information they want. Access does not imply a specific implementation such as web access. Access can include a phone contact to request soil survey information, printed information

available at a public source (library, field office, etc), or a web site access.

- **Soil Survey Supporting Data -** Supporting soil survey data include site pedon descriptions collected during conduct of soil survey and technical soil services, soil characterization data, soil performance measurement data, photographic and graphic images, field observation notes and other data collected.
- **Data Stores -** Those products, models, or systems that are produced or download official soil survey data and information from the soil data origin (NASIS transactional database), and then provide that data for use by customers for a period of time separate from the origin. Some data stores are relatively static and the data can become out dated such as a published soil survey reports, printed interpretative maps and tabular reports. Other data stores are more dynamic and can be updated with the most current soil data and information such as FOTG, SSURGO and interpretative maps and reports created using Soil Data Viewer.

4 Description of Existing System

Existing systems and their descriptions are grouped into: soil survey data; soil survey information and products; national program and models; technical references; and obsolete systems.

4.1 Soil Survey Data

Existing systems included in this group are the soil survey data that might be thought of as the raw soil data.

4.1.1 NASIS Repository (REPO)

The NASIS repository (data dictionary) is maintained jointly by the National Soil Survey Center in Lincoln and the Information Technology Center in Fort Collins. It contains all the data elements, definitions, and choice lists used in NASIS and other associated information systems. Data in the repository are directly available to a limited number of authorized users, but these users may export data from the repository to NCSS partners, the Federal Geographic Data Committee, or the general public. Some data in the repository are exported for use in other parts of the existing information system. For example, taxonomic classes maintained in the repository are exported as needed for use in the soil classification (SC) file, lab databases, and pedon description programs. Once exported, no additional controls exist to maintain synchronization or prevent editing of the exported data.

4.1.2 NASIS 5.0

NASIS (database application) is the principal system for managing map unit attributes, interpretation criteria, user-managed domains, pedon descriptions, field notes, and soil survey schedule data. Soil scientists throughout the National Cooperative Soil Survey are continually changing data in NASIS as a result of field data collection, project mapping, updating, and development of new interpretation criteria. NASIS has the capability to manage pedon descriptions, and some descriptions are entered and managed in NASIS. Approximately 90,000 pedon records have been converted from the obsolete Pedon 3.x databases to NASIS. Other locally developed systems are also used to manage pedon and transect data. NASIS has the ability to export data in the old SSSD style format to FOCS and the new SSURGO version 2 format. The new SSURGO version 2 format is used in the Customer Service Toolkit and Soil Data Viewer 3.0. In addition to these exports, NASIS has report writing tools that enable production of a wide variety of tabular and narrative reports and custom exports of data and interpretive results. Access to NASIS is restricted to authorized NCSS users, but these authorized users may export data to anyone.

4.1.3 National Soil Survey Laboratory Characterization Data (NSSL Data)

The National Soil Survey Laboratory maintains profile descriptions and laboratory characterization data in a variety of systems. NSSL users have access to these systems. Other NCSS users and the general public have access to the Lab Data via CD-ROMs and web access through the National Soil Survey Center's web site. The NSSL is creating a Laboratory Information Management System (LIMS) to assist with managing Lab Data. NSSL users will have access to LIMS. Data from LIMS will be distributed directly to a variety of internal and external users. Data from LIMS will also be exported to NASIS for eventual distribution to internal and external users as part of a comprehensive set of soil survey data.

4.1.4 Windows Pedon 1.0

Windows Pedon 1.0 is in the final stages of development and will meet current soil profile description standards. Windows Pedon is designed to run on Windows 95, 98, NT and 2000 providing the ability to record site information, profile description, transects and associate several sites together in a site association. Version 1.0 is expected for release early FY 2002. Version 2.0 will have the ability to transfer data to NASIS.

4.1.5 NCSS partner Laboratory Characterization Data (NCSS Partner Data)

Soil laboratories located at universities and other NCSS partner facilities collect and maintain laboratory characterization data used in the National Cooperative Soil Survey. These data are not generally available to other NCSS partners or the general public unless published in scientific journals or otherwise specifically requested. Partner laboratories typically maintain their own unique systems for data storage and retrieval.

4.1.6 NCSS - Forest Service - Natural Resource Information System (NRIS) Terra v. 1.01 Database

The NRIS–Terra database is one of 6 corporate databases currently in use or being developed by the Forest Service to house natural resource information on National Forest System lands. The NRIS system is composed of six modules that include; air, water, terrestrial (Terra), existing vegetation, Fauna and Human Dimensions.

The Terra module stores map unit, component and point data attributes associated with the Terrestrial Ecological Unit Inventory (TEUI). The TEUI includes information about soils, potential natural vegetation, geology and geomorphology. Soil profile descriptions collected as part of integrated plots are stored and linked to a GIS point coverage. In addition, map unit and component summary information is stored and linked to a GIS polygon coverage. The soils portion of TEUI is used to record and manage soil data. However, the soil data model structure of TEUI and NASIS differ significantly making it difficult to share data and results in a duplication of soil data between NASIS and Terra.

The Terra module includes reporting functionality as well as a customized ArcView extension that allows Forest Service specialists to query and display TEUI information for use in forest and project planning and analysis.

4.2 Soil Survey Information and Products

Existing systems included in this group are those that might be thought of as the soil survey products that are delivered to internal and external customers.

4.2.1 Published Soil Survey Report (PSS)

Traditional published soil surveys include soil survey data in the form of conventional manuscript tables, narrative descriptions and maps. These tables and descriptions are typically produced from

tabular information stored in NASIS or other databases, but may be edited after they are created from their respective databases. Soil map sheets are created from analog and digital maps. Digital map finishing for publication is becoming the standard method for creating published soil map sheets. SSURGO is the source for the digital soil map.

4.2.2 State Soil Survey Geographic (STATSGO) Database

The STATSGO data set is a complete package of spatial and tabular information developed at the state level, but created and designed for use across state lines. Tabular data are in a pseudo-SSSD format developed from S-5s in the late 1980s. These data are available to internal users and the general public, but have had little updating since they were first developed. STATSGO data are intended for use at the state and regional level, and as such are designed to meet different needs and purposes than SSURGO or other kinds of soil survey data. STATSGO tabular data will be converted to NASIS in FY2001-2002, which will provide us with the ability to update the tabular data, manage it on a continuing basis, and provide new interpretations from the data.

4.2.3 Soil Survey Geographic (SSURGO) Database

The SSURGO data set is a complete package of spatial, tabular and metadata information for an individual survey area. The spatial data are certified to meet National Cooperative Soil Survey (NCSS) map development standards; tabular data are certified to match the correlation document for the survey; and the spatial and tabular data are jointly certified to have internal referential integrity. The metadata complies with Federal Geographic Data Committee (FGDC) Version 2 Metadata Standards These data are distributed to internal users and the general public via CD-ROM and through FTP servers at Fort Worth, Texas. The majority of the currently available SSURGO data sets have tabular data that are in SSSD format. Certified SSURGO data are not the official data for a survey area, unless specifically identified as such in the Field Office Technical Guide. The new data structure for the tabular part of the SSURGO data has been implemented as of April 2001 (SSURGO Version 2). This new data structure is consistent with and modeled on NASIS 5.0 structure. Data sets previously archived in the SSSD format will be re-archived in the new format.

4.2.4 Field Office Technical Guide (FOTG)

Section II of the Field Office Technical Guide is the principal medium for distributing soil survey data to field offices and field

service centers for use in agency programs. However, we seldom consider the FOTG to be an effective medium for distributing soil survey data to NCSS partners and the general public. Nevertheless, the FOTG represents the official copy of soil survey data (General Manual Title 430, Part 402.5). In some cases, the FOTG points to another medium such as the published soil survey report, FOCS database, Customer Service Toolkit (CST), or SSURGO as the official data.

4.2.5 Customer Service Toolkit – Soil Data Viewer (CST-SDV)

The CST is a replacement for FOCS. The soil database in CST 3.0 is in the new SSURGO version 2 format and incorporates new interpretations developed in NASIS. Agency programs implemented in the CST will use soil survey data stored in the CST soil database. The CST also includes a Soil Data Viewer, which uses SSURGO version 2 spatial and tabular soil survey information to display soil data and interpretations on maps. The SDV has more capabilities than the Soil Explorer. We expect that NCSS partners with access to the SDV will find it useful for analyzing and displaying soil survey information. Consequently, CST and SDV are distribution media for soil survey data to internal agency users and some of our NCSS partners.

4.3 National Programs and Models

Existing systems included in this group are those that use soil data and information in support of USDA and NRCS national program responsibilities and models used in resource assessment and conservation planning activities. This is not an all inclusive list but a representative sample.

4.3.1 National Resources Inventory (NRI)

Although not a part of conventional soil survey data distribution, the NRI provides NRCS users and the general public with soil data and interpretations on a statistically reliable basis throughout the United States. Data used in current NRI products are based on static S-5 data sets “frozen” in 1992. Agency decision-makers and the general public have access to these data through NRI publications, the NRI web site and data analysis software.

NRI has traditionally operated on a 5-year cycle. In recent years, this 5-year cycle has been supplemented with special inventories on selected Primary Sample Units (PSUs). This trend toward more frequent sampling is part of a deliberate move toward a continuous inventory.

The continuous inventory will consist of an annual sample of approximately 73,000 primary sample units (PSUs) in the 50 states, District of Columbia, Caribbean Region, and islands in the Pacific Basin. Remote sensing and photo-interpretation techniques will be used to gather information for each of the 73,000 PSUs. Approximately 15,000 of the 73,000 PSUs will be scientifically selected for additional onsite data collection.

The continuous inventory retains the *foundation* sample of 300,000 PSUs used in past 5 year cycles and draws from that foundation a *panel* of approximately 40,000 PSUs. The same 40,000 PSU panel will be used from year to year. In addition to the primary 40,000 PSUs panel, a secondary panel of approximately 30,000 PSUs will be drawn from the remaining foundation sample. This secondary 30,000 PSUs panel will be redrawn from the foundation each year based on the current needs for NRI and is likely to include PSUs not in the previous secondary panel. Only the 73,000 PSUs in the two panels will be inventoried in any year.

Results from the 2000 inventory will be delivered to Congress before the end of February 2002, which provides an 18-month cycle from collection to delivery.

Part of the inventory process involves identifying the soil characteristics at each point in the PSU. Ideally, the soil survey data connected to these points would be contemporary with the time at which the point is inventoried. This has not been the case since 1992. The 1999 and 2000 inventories have been asked to make a new link to soil survey data, independent from previous inventories. Connecting each PSU point to contemporary soil survey data may not be accomplished at one time because of resource constraints, but there is nevertheless a need to connect points to soil data contemporary with the inventory cycle.

4.3.2 Conservation Technical Assistance (CTA)

The primary role of NRCS and employees of other entities or agencies under the technical supervision of NRCS is to help clients on opportunities, potentials, and problems related to natural resource use. Technical assistance may include program formulation, planning, application, and maintenance. All will be carried out using the planning process. Technical assistance is generally confined to assisting clients with their resources. Section II of the Field Office Technical Guides contains the soil data used in providing technical assistance.

Current USDA NRCS policy states that the Official soil survey data resides in the local Field Office Technical Guide (FOTG), or is referenced to another location by the FOTG.

Not all the soil data and information in the local FOTG are in electronic form or are managed in NASIS. An example is the 1990 frozen soil list (HEL/NHEL). This makes delivery of official soil survey data to external customers problematic.

4.3.3 Conservation Reserve Program (CRP)

Conservation Reserve Program (CRP) seeks to preserve our Nation's capacity to produce agricultural products by protecting those lands most susceptible to erosion. To achieve this goal, USDA provides payment to landowners who remove highly erodible land from production and also protect those lands from erosion. To assure that all landowners are treated fairly and equitably, USDA established policies and procedures to administer the Program. One of these policies specifies that determinations of highly erodible land shall be made from soil survey data as it existed in 1990.

The definition of highly erodible land is based on the Universal Soil Loss Equation (USLE). Slope length, slope gradient, erodibility factor (k factor), rainfall factor and allowable soil loss T factor are required to calculate an erodibility index (EI) and thus determine whether a soil is highly erodible (HEL). Since slope gradient is expressed as a range of values in the soil survey database, a soil may be highly erodible when considering the upper end of the slope range, but not highly erodible when considering the lower end of the slope range. These soils are identified as potentially highly erodible (PHEL) under the program definition.

Each soil survey map unit that existed in the 1990 Field Office Technical Guides (FOTG) is identified as HEL, PHEL, or NHEL (not highly erodible). These determinations were made by augmenting exiting values in the soil survey database with rainfall factor and slope length (or LS factor) estimates to calculate the erodibility index.

The FOTG frozen 1990 soil data are used for program support of CRP, even if newer updated soil maps and attributes exist for the soil survey area. For areas where surveys were underway in 1990 and are still on going, new mapunits can be identified and added to the soil map and legend, but only in the context of the 1990 data.

The frozen 1990 FOTG soil data used in making HEL determinations and CRP rental rates determinations do not exist in a consistent electronic format that is available throughout the country. These data are more commonly hard copy lists in the Field Office Technical Guides. This makes it difficult for external customers to access this information.

4.3.4 Farm Land Protection Policy Act (FPPA)

The purpose of the Farmland Protection Policy Act (FPPA) is to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses. FPPA ensures, to the maximum extent practicable, that Federal programs are administered in a manner that is compatible with State and local governments, and private programs to protect farmland.

NRCS is the agency primarily responsible for implementation of the FPPA. Under FPPA, NRCS is to provide technical assistance to Federal agencies, state and local governments, tribes, or nonprofit organizations that desire to develop farmland protection programs and policies. NRCS summarizes FPPA implementation in an annual report to Congress.

Land Evaluation and Site Assessment (LESA) created on a county basis is the primary tool used to facilitate NRCS meeting their National responsibility for FPPA.

Each NRCS field office will have available a single coordinated list of prime farmland, unique farmland, and those of Statewide and local importance as defined in the FPPA and Section 657 of the rule (Federal Register, Volume 43, No. 21. January 3, 1978 Part 657). The list and maps will be filed in the Field Office Technical Guide and will be available for use by governing officials, landholders, developers, or others upon request.

4.3.5 Land Evaluation and Site Assessment (LESA)

The Land Evaluation (LE) portion of LESA is the responsibility of NRCS. The Land Evaluation criterion, relative value is based on information from several sources including national cooperative soil survey or other acceptable soil surveys, NRCS field office technical guides, soil potential ratings or soil productivity ratings, land capability classifications, and important farmland determinations. Based on this information, groups of soils within a local government's jurisdiction will be evaluated and assigned a

score between 0 to 100, representing the relative value, for agricultural production, of the farmland to be converted by the project compared to other farmland in the same local government jurisdiction. This score will be the Relative Value Rating on Form AD 1006.

LESA systems are designed to be flexible and can be developed at various levels of government, i.e., State, county, or township, or for an area such as a Major Land Resource Area (MLRA). More than one LESA can exist for a geographic area such as township and state. When a LESA is updated the previous LESA must be archived.

The Computer-Assisted Land Evaluation System (CALES) is a tool designed to aid in the determination of the relative quality of land for agricultural uses and the creation of the LE portion of LESA.

4.3.6 Revised Universal Soil Loss Equation (RUSLE)

Revised Universal Soil Loss Equation (RUSLE2) is a tool for estimating soil erosion from a specific geographic area such as farm fields and used in conservation planning activities at NRCS field offices and general public. RUSLE2 imports the most current official soil attributes certified for use in the RUSLE2 application. When soil data are updated RUSLE2 needs access to previous versions of soil data to validate and re-run the erosion model for a customer. Currently, RUSLE2 does not capture metadata information about the version or vintage of soil data used.

In the application a choice list of each component of the mapunit is displayed for user selection. RUSLE makes a copy of selected soils data and creates an internal RUSLE soil table. The run saves the links to this soil table. Other resource data are used in conjunction with soils data, including climate, vegetation, residue, field operations and erosivity.

4.3.7 Wind Erosion Prediction System (WEPS)

Wind Erosion Prediction System (WEPS) is a tool for estimating wind erosion from a specific geographic area such as farm fields and used in conservation planning activities at NRCS field offices and general public. WEPS links to the most current official soil attributes certified for use in the application the MS Access soil database in SSURGO version 2 format. When the model is run the data used are stored as a file for the customer. This archives

the data used in decision-making. Currently, WEPS does not capture metadata information about the version or vintage of soil data used.

4.4 Technical References

Existing systems included in this group are those soil data and information that might be thought of as technical references for the conduct of soil survey.

4.4.1 Official Series Description (OSD)

The official series descriptions (OSD) are available to NCSS partners and the general public via web access at Ames, Iowa. Although the narrative part of the OSD are available from a sole source at Ames, the physical, chemical, and morphological properties associated with a series concept are found in several places, including the narrative part of the OSD itself, on obsolete S-5s, and in data mapunit records in NASIS. OSD are maintained in conjunction with the Soil Classification File at Ames. Queries are available to retrieve and download OSDs from the database via web access.

4.4.2 Soil Classification File (SC File)

The SC File is maintained at Ames, Iowa. It is a single source that correlates taxonomic classification with each official series, thus providing the taxonomic class for each series. Queries can be used to generate lists of benchmark soils and soils in selected taxa. The SC File is available to NCSS partners and the general public via web access at Ames, Iowa. The taxonomic classes included in the SC File are derived from Soil Taxonomy and are stored in the NASIS repository (data dictionary), but the SC File may be edited independently.

4.4.3 Soil Taxonomy and Taxonomic Keys (Taxonomy)

Narrative text for Soil Taxonomy and the current version of the Keys to Soil Taxonomy are maintained in word processing format at the National Soil Survey Center. These word processing files are used to create web versions of Soil Taxonomy and the Keys to Soil Taxonomy, and produce hard copy publications. NCSS partners and the general public have access to Soil Taxonomy through hard copy publications and the National Soil Survey Center's web site. Proposed amendments to Soil Taxonomy are maintained at NSSC until approved, at which time they are issued as a national Soil Taxonomy Handbook amendment and included in section 615 of the National Soil Survey Handbook, which is posted on the web site at ISU. The NASIS repository, which

should have all current and previous taxonomic class names, is synchronized with word processing files by hand on a continuing basis.

4.4.4 Soil Survey Laboratory Methods Manual

The Soil Survey Laboratory Methods Manual describes the methods used by the laboratory at the National Soil Survey Center (NSSC). They are documented by method codes and linked with analytical results that are stored in the NSSC laboratory database.

4.4.5 National Soil Survey Handbook, Soil Survey Manual, and the Field Book for Describing and Sampling Soils (NSSH, SSM, Field Book)

The National Soil Survey Handbook (NSSH) and Soil Survey Manual (SSM) provide basic guidance for conducting the National Cooperative Soil Survey. These two documents are available to NCSS partners and the general public via the National Soil Survey Center's web site at ISU. The second edition of the Field Book for Describing and Sampling Soils, which will be available in hard copy, combines information from the NSSH, SSM, Soil Taxonomy and other sources in a user-friendly format for the field soil scientist. The first edition, which was extremely popular, is available on NSSC website but no longer available in hard copy. With each new edition of the Field Book and other policy documents, serious attempts are being made to coordinate the information among all of these documents.

4.5 Obsolete Systems

Existing systems included in this group are those soil data and information systems that currently exist in limited locations but are being phased out and whose data and functions are being implemented in one or more of the other existing systems previously described above.

4.5.1 State Soil Survey Database (SSSD)

Despite the fact that all SSSD data were converted to NASIS, and SSSD was officially decommissioned, a few states continue to distribute data from SSSD. Typically, data distributed from SSSD are "archived" data that represent a known version of data for a survey area or otherwise represent a static set of data that is convenient for local use. Support for the system is negligible and its use is decreasing.

4.5.2 Soil Interpretation Record (SIR, S-5, or SOI-5)

Although the official soil interpretation record (SIR) database has been decommissioned and archived, copies of unknown vintage

continue to be used for national, state, and local purposes. At the national level, SIR data are used to create basic soil rankings used in support of the Conservation Reserve Program (CRP) and to meet other national programmatic needs. In some states, SIR data are used as a convenient method of maintaining ranges of characteristics for official series and for distributing soil survey data to users.

4.5.3 Map Unit Interpretation Record at Ames (National MUIR)

The National MUIR was developed about 1990 to provide the general public with convenient web-based access to soil survey data. It was originally created from copies of SSSD data acquired from all states. Data are stored in SSSD format. Only a few states actively maintain data in the National MUIR, thus most data are nearly ten years old. The National MUIR is open to the public and continues to be actively used.

4.5.4 Pedon 3.6

Pedon 3.6 and earlier 3.x versions of Pedon are older systems for entering and managing soil profile descriptions. Although the 3.x data model does not accommodate current soil profile description standards, it is still used by soil scientists in some locations. Data from PDP can be exported from any PDP system and imported into any other PDP system. This capability was typically used to transfer profile descriptions from field offices to state offices or to the National Soil Survey Laboratory. A new Windows Pedon 1.0 scheduled for release in early FY2002 will replace Pedon 3.6. The new Windows Pedon will meet current soil profile description standards and version 2.0 will be able to transfer data to NASIS. Data from Pedon 3.6 have been imported into NASIS.

4.5.5 Field Office Computing System (FOCS)

FOCS is an older system that is being replaced by the Customer Service Toolkit. FOCS uses a soil database in the old SSSD format and includes a variety of reports that include soil survey data. Many of these reports are used to prepare soil survey information for distribution to the general public. In some cases, the soils data in FOCS were designated the official copy of the soil survey by reference in Section II of the FOTG.

4.5.6 Soil Explorer (Explorer)

The Soil Explorer was designed as a marketing medium to demonstrate one of several possible alternatives for distribution of soil survey data and to investigate the issues associated with providing data in alternative forms. It has been enormously

popular with the general public and has clearly demonstrated a need for delivering soil survey data in a variety of media. The Explorer uses SSURGO data in the old SSSD format and includes older interpretations, some of which are no longer supported by NRCS.

5 Principal Limitations of the Existing System

The principal limitations of delivering soil data and information from the existing systems are organized and described by the limitation. The existing system that serves as an example of the limitation is included in the description.

5.1 General

In general the limitations of our existing systems are that we manage and deliver data from several independent systems at different times to various customers. Figure 1 illustrates the complexity and the independent nature of our current system of managing and delivering soil survey data.

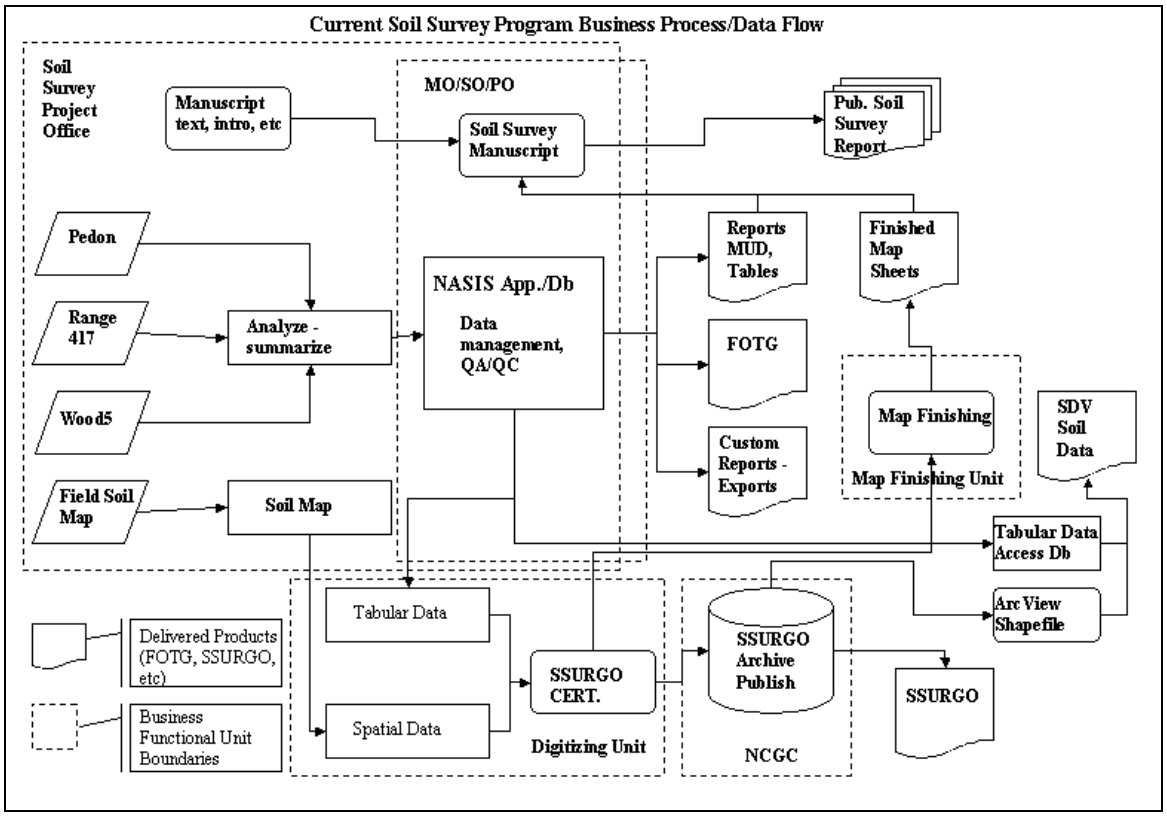

Figure 1: Current process for managing and delivering soil survey data and information

On the left of Figure 1 are data collection and management systems, pedon, soil map, etc. The middle portion of Figure 1 represents the soil survey data management of map unit information in NASIS database. The current NASIS database provides for the day-to-day management of the soil survey data, this can be thought of as transactional soil data. On the right part of Figure 1 are the products of soil survey data and information that we deliver. In the existing system soil survey attributes are managed separate

from the soil survey maps and are only merged in the creation of the SSURGO product or published soil survey report.

Soil survey data and information for FOTG, soil reports, manuscript tables are generated from the NASIS database when needed. The development of the published soil survey report utilizes data from NASIS, soil maps from SSURGO, and manuscript text from word processing systems. These are merged together to create the published soil survey report.

Delivering soil data and information from independent systems at different times and creating separate products representing data stores are part of the many reasons for the following system limitations.

5.2 Proliferation of Redundant Data

In many parts of the existing system, data are copied, entered and maintained in separate locations with the intent of having the same data at different locations. Maintaining separate copies of identical data requires considerable time and is rarely 100 percent successful. Examples are:

- Taxonomic classes used in pedon descriptions in NASIS and in the SC File.
- Soil data published in tables in a soil survey report and the data in the SSURGO data set.
- Duplicate soil data entered or managed in Forest Service NRIS-Terra and NASIS.

5.3 Inconsistent Data and Interpretations

The existing system uses a mix of data models, including the old SSSD model and the newer NASIS model. The existing system also uses a mix of interpretations based on the Ames generated interpretations (old SIR interpretations created from PL-1 programs) and the newer fuzzy logic interpretations generated in NASIS. Even if the data are contemporary in these two data sets, the data and interpretations derived from these data sets are likely to be different for many uses.

5.4 Lack of Compliance with Federal Geographic Data Committee Standards

None of the existing data formats are in total compliance with FGDC standards. This is due partly to the fact that the FGDC standard is based on the NASIS 2.0 data model and the NASIS data model has changed since the standard was established. The FGDC standard can be redefined and updated, but because our existing systems use a variety of data models, not all of them can be FGDC compliant.

5.5 Inability to Identify, Maintain, Use, and Distribute Official Data

The proliferation of redundant data and multiple sources of soil survey data make it virtually impossible to know whether or not data in any of the existing systems is an accurate representation of the official data for the survey area. Even the SSURGO data, which is widely distributed and recognized as "certified" data is rarely the same as the "official" data. Spatial and tabular data are managed in separate systems and an unambiguous connection between the spatial and attribute data cannot be guaranteed. Some laboratory characterization data at partner laboratories is virtually inaccessible.

5.6 Inability to Identify and Maintain Versions of Data

The proliferation of data and multiple sources of data make it difficult to acquire older copies of data and to know whether an older copy of data ever represented "official" data. Data in NASIS are continually changing. Products produced from NASIS, such as SSURGO exports and manuscript tables, may represent an "official" version of the data but formally recognized versions of these data are difficult to track.

6 Fundamental Requirements

The fundamental requirements for delivering soil data and information are organized and described by the requirement. Examples of the requirement are included in the description.

6.1 General

The basic requirement is to deliver consistent official soil survey data of high quality that meets our customer and national program responsibility. Soil data referenced here is most commonly the mapunit information for a soil survey. However, supporting soil data such as point site pedon data and soil characterization data are included.

6.2 Identify and Access Current Official Data for a Specific Use

A wide variety of users, both internal and external, need access to the current set of soil survey data for land use planning and natural resource assessment. We want to assure that the data they acquire are current, consistent, and repeatable. We also want to assure that the data they acquire are the data we have reviewed and approved for general release. For example, district conservationists in field service centers need access to officially recognized soil survey data for conservation planning and administration of conservation programs. The data they use must be the current official data. We have typically satisfied this need by maintaining

current official data in the FOTG, but the FOTG is not generally available to all users of soil survey data. We need the ability for all users, internal and external, to identify and access current official data whether they get this data via the Web, from a State Soil Scientist, or from a local field office. Each distribution point should be delivering the same data.

- Current official data for modern conservation planning.
- Official data for national program implementation.

6.3 Identify and Access Previous Versions of Official Data for a Specific Use

In the administration of agency conservation programs, and particularly for NRI, we need access to previous versions of official data. We also need to know the time period during which the data were current. For example, NRI conducts periodic inventories of natural resource conditions and uses soil survey data to enhance the value of the inventory. These periodic inventories are analyzed to determine trends in resource conditions. To perform accurate trend analysis, NRI needs access to versions of data appropriate to each inventory. Likewise, the administration of CRP and other agency conservation programs require reference to official data current at the time contracts are executed.

- Some data can be restricted to authorized access. This might occur where soil data have been published with significant errors. The data would be archived but unavailable for general access by users.
- Address the linkage to different versions of data, component in a DMU linked to a pedon, the original sampled as pedon and if updated the new pedon. The DMU needs to link the pedon data the user needs for a specific use.
- Example is the archived data (frozen 1990 list) for programmatic requirements (CRP). Implementation in electronic format is not required but it's continued access availability is still required (e.g. hard copy in FOTG).

6.4 Maintain, Identify and Access More Than One Set of Official Data for a Geographic Area

Typically, we maintain two sets of official data for any geographic area; detailed soil survey data, and general soil map data. In many instances, these are SSURGO and STATSGO data. Both are official data, and both are good products when used as intended. Likewise, many states have developed statewide legends designed to meet specific needs such as equalized taxation or equitable land use regulation. The legends and associated data used by these states are designed to meet specific needs, which may be different from the needs identified for individual survey areas. Thus, we need to be able to:

- Maintain, identify, and access one or more soil survey data sets appropriate for different specific uses in a given geographic area.

- Uniquely identify legends, mapunits and components (NRI).
- Frozen soil list e.g. 1990 frozen HEL list (CRP).

6.5 Maintain, Identify and Provide Access to Soil Survey Supporting Data for a Geographic Area

Supporting soil survey data include site pedon descriptions collected during conduct of soil survey and technical soil services, soil characterization data, soil performance measurement data, photographic and graphic images, and field observation notes.

- For a geographic area identify supporting soil data and provide access to utilize these data in reports, interpretations and downloads with other resource data.

6.6 Access to Reporting and Downloading Capability

Majority of the other requirements deal with the identification and access to soil data. Access implies that the user has the ability to get soils data and information as a tabular report, a spatial map, or a prepared product like the published soil survey report. User can view or get as an electronic version.

- Soil maps and soil thematic maps which include the ability to select and create a specific interpretative map for example Septic Tank Absorption Field or weighted average organic matter for the upper 10 inches of the surface.
- Tabular reporting includes viewing and downloading results from a selection of available reports. Reporting capability allows for selecting needed data.
- Support for new reports to meet user needs.
- Type of Reports include print on demand interim soil survey reports, published soil survey reports, mapunit descriptions and brief non-tech soil descriptions.
- Download selected raw soil data attributes in electronic format.
- Graphical Report such as properties with depth (clay/depth) and water table depth per month.
- Images (profile, landscape, land use photographs).

6.7 Identify Changes Between Versions of Data Released to Users

When data users discover differences in interpretive results between one version of data and another version, we need to be able to examine both versions of data and determine the differences that exist between the versions.

- If portions of a soil survey have been updated by updated mapunit DMU, then we need to be able to identify which mapunits have updated data report both tabularly and spatially.
- Identify changes in criteria for updated interpretations.

- Identify new interpretations included in the updated soil survey data.
- Identify which attributes have changed and the before and after values.

6.8 Identify Geographic Areas Where New Data Have Been Updated Since Some Previous Date

NRI needs to evaluate workload for sampling by examining where soil survey data have been updated since the last NRI cycle. Geographically select PSUs for areas that have updated soil survey data. Another example is review of the status of updated soil survey data in the nation.

- Report tabularly or spatially.

6.9 Identify Changes Between the Most Up-To-Date Data and Official Data

After soil survey data are examined, certified, and released for use as official data, we continue to "maintain" the data by correcting errors, supplement the existing data with new data, or in the case of updating a survey area we make substantial changes to the data. State soil scientists are responsible for maintaining a current set of official data. They need to know what changes have been made in the NASIS transactional database (most up-to-date data) since the last official data were released. This provides a tool to assist in determination if a new version of official data must be released.

- Access to most up-to-date data is restricted to authorized users.
- A variation is the need to distinguish between components and mapunits with updated data (taxonomy) based on field investigations from those mapunits that have updated component taxonomy because a series has been updated but no field investigations have occurred on the mapunit.

6.10 Deliver the Most Up-To-Date Data for Specific Uses

Most up-to-date data is in NASIS transactional database. Although most users need a known version of static official data with an identifiable citation, some users need access to the most up-to-date data not yet publicly released. This data includes mapunit information, supporting soil survey data, interpretations, technical references, etc. Access to pre-released data is to meet a very specific need such as field-testing, model validation (WEPS) and field validating interpretation criteria and results. Another example is utilizing existing non-released data for a special site investigation such as soil properties on research plots and soil characteristics for engineering practices where users need the most up-to-date data for their specific use. The most up-to-date data normally is not used for official purposes.

- Access to most up-to-date data is restricted to authorized users.

6.11 Deliver Data to Meet Specific Needs

Different products and different data users have different needs for data. We need to provide soil survey data that have both format and content that meet the needs of these products and data users. SSURGO is a data product that has specific data needs that are different from the needs of erosion prediction or other environmental models. NRI may require that key fields and specific identifying characteristics (mapunit symbol, component name, slope) be available to create choice lists for field inventory tools. Once the choices are entered in the field, NRI needs to re-visit the official data of the same version to acquire soil survey data used to enhance NRI analysis and products. Some applications, such as Customer Service Toolkit and NRI, need access to previous versions of data of known vintage (so-called "frozen data"). The following is a preliminary list of products.

- SSURGO.
- STATSGO.
- NRI data set.
- FOTG includes issues related to state custom MS Access template reports and Soil Data Viewer rules file.
- Published soil survey report.
- Soil characterization data.
- RUSLE2 data set.
- WEPS data set.

6.12 Create New Interpretations from Current or Previous Official Data

In cases where the physical, chemical, and morphological properties in the current official data have not changed, but new interpretations are needed, we want to be able to create new interpretive results from the existing current official data including soil survey supporting data. One example of this situation occurs when agency programs require a new specific interpretation, such as crop growth index, to be uniformly applied in all situations. The new interpretive result is not available for survey areas previously released as official data. We do not want to make any changes in the soil properties in those data sets. In some cases, we may even want to create new interpretive results from previous versions of data in the administration of agency programs.

- Mapunit level interpretation results based on dominant soil, dominant condition, most limiting, least limiting or weighted average.
- Ability to interpret using aggregated component or site point pedon data.
- Update official data with new additional interpretations.
- Interpretation utilizing other resource data such as climate, land use, vegetation, geology, political boundaries or cultural features.

6.13 Apply Interpretive Criteria to Selected Map Units or Geographic Areas

Some interpretive criteria are intended for use on limited geographic areas such as towns, counties, or watersheds. We want to select the specific map units, pedon sites or geographic areas on which to apply the interpretive criteria.

- Development of LESA for a jurisdictional area.
- Displaying an interpretation valid for a specific geographic area such as an interpretation based on county or state septic tank absorption field criteria.

6.14 Provide Selected Attributes for Any Geographic Area

When delivering data to meet specific purposes, we need to select only those soil characteristics desired for a limited list of map units. For example, when working with a consulting engineer on a residential development, we need to provide current official data for only the five map units on the tract under consideration and we need to provide soil moisture, drainage class, restrictive features, and construction interpretations for only those five map units.

- Source Technical Soil Service Analysis Document.

6.15 Select Data by Any Attribute Without Respect to Geographic Area

We want to select from the most current official data set those map units that meet certain defined characteristics regardless of their geographic location. One example of this function is to test the effect of new taxonomic criteria where the results are expected to be limited to a geographic region. The results of the selection may show that soils in an entirely different geographic region are also selected, indicating possible deficiencies in the new criteria. We may also want to select from the official data set those map units affected by new national conservation program rules.

- Provide spatial (map) and tabular reports and download capability.

6.16 Provide Data That Can be Used to Create Seamless Spatial Coverage

When official data are delivered for different soil survey areas, we want these data to join with their corresponding spatial data in such a way that data from the two survey areas can be used to create a seamless coverage. In many cases, an area of interest straddles a survey area boundary and requires soil survey data from multiple soil survey areas. We want to join data from these areas easily and unambiguously to create a single seamless coverage that we can use for land use planning.

6.17 Provide Complete National Coverage of Data

Many nationally administered programs, such as the Conservation Reserve Program, require access to a national single coverage of current official data that is as geographically complete as possible. This includes the spatial and tabular (attributes) soil survey data. Typically, selected attributes are used in the administration of a variety of programs and in some cases, new interpretive criteria may need to be created or new results calculated from the existing current official data.

6.18 Notify Data Users When Data Have Changed

The National Soil Survey Handbook specifies that, to the extent possible, we notify data users when the data they have acquired have been updated. We also need to be able to identify the changes that have occurred (*see* Identify changes between versions of data released to users).

- Provide users the option of being notified when data they have accessed and download has been updated and changed. No requirement that user must leave any information when accessing and retrieving data.
- This covers the publicly released soil data not the most up-to-date transactional data.

6.19 Notify Data Users of Product Plans and Progress

When data users are told that their desired soil survey product is unavailable, they routinely inquire as to when it will be available or whether there are plans to produce the requested item. We want to inform data users of critical timeframes affecting the products they need.

- Provide access to soil survey status maps or other information that provides users with information about the progress, plans or product delivery schedules.

6.20 Provide Stability in Product Content and Delivery Format

Users of a specific product, such as SSURGO, rely on a stable structural content (tables, columns, relationships) and delivery format (ASCII pipe delimited text, XML, MS Access DB, etc) for a period of time. Provide a period of time (3 to 5 years) where a product will be available with the same structural content and delivery format. When a product structural content and delivery format are updated, provide users the ability to get soil data in the last version of the content and format. This allows users that have developed applications using a product a period of time that they can prepare to re-tool their application.

- Provide stability in data transfer content and format. NRIS-Terra downloading soil survey data in SSURGO version 2 format can rely on access availability.

- Models using data extract routines continue to have access to the same data format.
- Provide users with a notice and time line for product content and delivery format changes.

6.21 Eliminate Inconsistency

We must guarantee that soil survey data used by one application is consistent with the same data used in another application or acquired from another source. For example, soil survey data used in the FOTG, Customer Service Toolkit and Soil Data Viewer must be consistent with data used in SSURGO. We expect that a user of SSURGO must see the same soil properties and interpretive results as a user of the Soil Data Viewer for the same vintage and version of the soil survey.

6.22 Eliminate Redundancy

To the extent possible, we must reduce multiple instances of what are intended to be the same data. Maintaining multiple instances of soil data that represent the official source makes it difficult to maintain consistency of the current official data.

6.23 Protect Data from Loss or Modification

Official data are static and must not be changed unless a new version is created. When new versions of data are made available, the previous versions must remain available and must be protected from loss. In a manner similar to the FOTG, once a data set is available and used in conservation planning, that version of the data must be available even after it has been updated by a newer version because contract provisions and management decisions have been based on the previous data.

6.24 Comply with Federal Geographic Data Committee (FGDC) Soil Geographic Data Standard

In the process of maintaining consistency and providing data to meet specific needs, at least one view of the data must comply with FGDC standards.

6.25 Provide Access to the Technical References, Standards and Guides for Soil Survey

Provide access to Soil Survey Technical References, Standards and Guidance for conducting soil survey. NCSS partners and general users use Official Series Descriptions and the Soil Classification File to understand the series concepts and soil landscape relationships. Technical references need to be available to anyone interested.

- Soil Survey Manual.
- Soil Taxonomy.

- National Soil Survey Handbook.
- Field Book for Describing and Sampling Soil provides guidance and conventions for describing soils.
- Soil Survey Laboratory Methods Manual.
- Forest Service – Terrestrial Ecological Unit Inventory Technical Guide.

6.26 Provide Metadata, Detailed Information or Description of Products and Data Provided to Users

Metadata for the information delivered to customers. Metadata includes the formal FGDC metadata standard for SSURGO, but also includes attribute data dictionary for selected data, description of products and their use constraints and limitations, methods used in processing and creating the product or data extracts, read me files, etc.

- Description of criteria used in generating interpretations.
- Criteria used in interpretative attributes (K, T, prime farmland, hydric, etc.) can be included in technical references, guides and handbooks. (see Provide Access to the Standards for Soil Survey).
- Versions of Metadata.
- Help on access, selecting and referencing official data.
- Information for points of contact for additional use and understanding of the soil survey information.
- Provide for user comments and feedback.

6.27 Integration with Other Resource Databases

Integration with other resource data sources provides the ability to create interpretations using soil data and other data sources. It also provides an improved level of data consistency and quality by reducing duplication of the soil data that is managed by other entities.

- Integrate with other resource data layers (climate, ecological site information (ESIS), vegetation, PLANTS, land use, political boundaries, cultural, etc)
- Integrate with other soil data sources such as NRIS-Terra, ARS research plots, University soil data, and private sector.

7 Appendix A – Entity Relationship Model

7.1 Entity Relationship Model

The entities in this model are high-level abstractions that generally correspond to the “objects” in the NASIS database. The purpose of the model is not to show all relevant details but to give an overview of the major data sources and their relationships (Figure 2).

Note that all the entities are shown as children of Metadata. This reflects the fact that each instance of a data object will be associated not just with the metadata describing its content but with a specific version of the metadata, so that changes in data structure or definition can be tracked over time and linked to versions of the data.

The entities in dashed lines are not specifically part of the Soil Data Delivery model. They represent examples of likely future extensions that will integrate the soils data with other inventory data such as ecological site information, cropland information, climate, geology, etc.

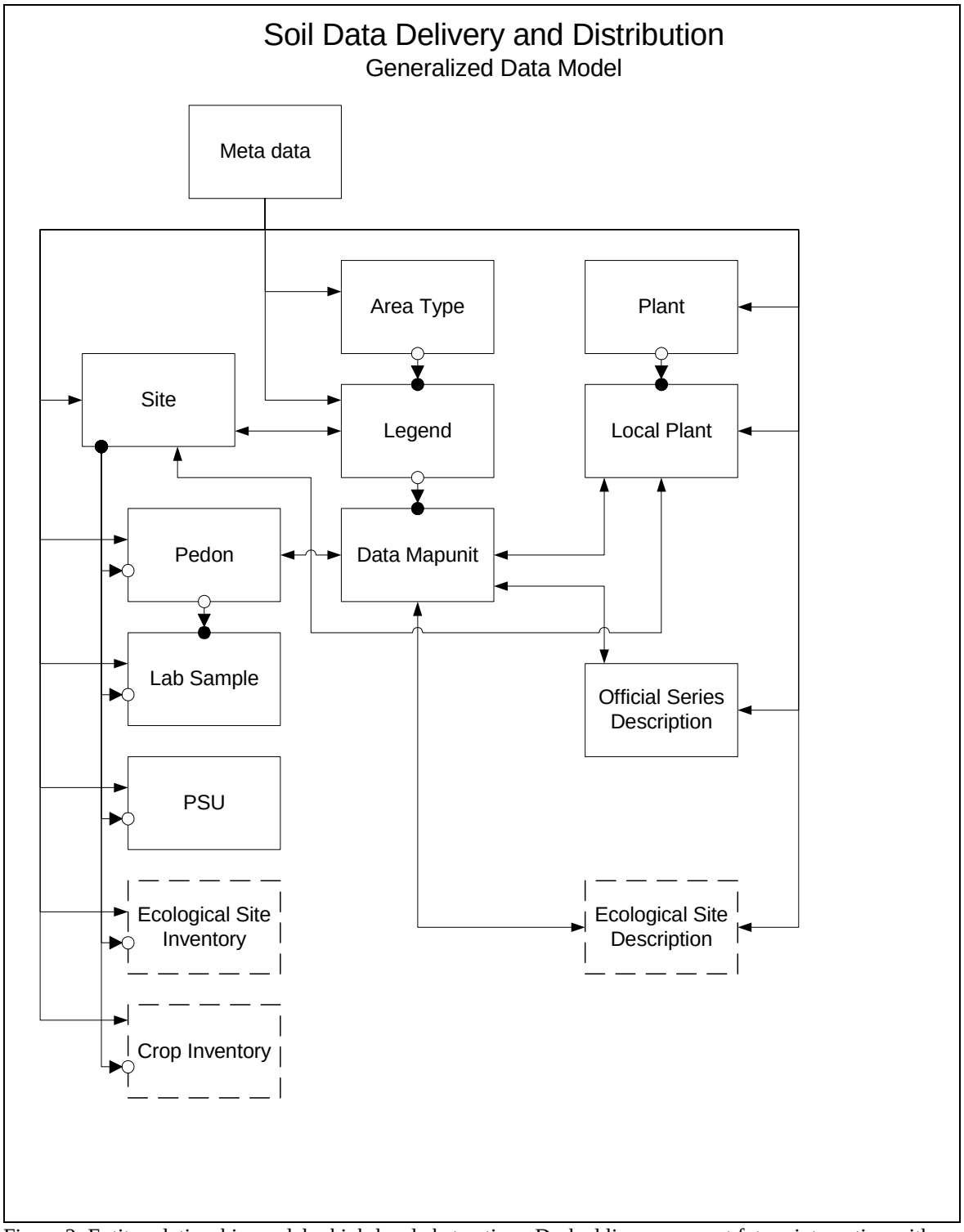

Figure 2: Entity relationship model – high-level abstraction. Dashed lines represent future integration with other data sources

8 Priority List of Fundamental Requirements

This table is designed to give guidance to the design and implementation in a phased approach to development. The initial priority proposed by analysis team.

Requirement	Business Area	Implement Priority
6.20 - Provide stability in product content and delivery format	USFS, SSURGO, Models	1
6.23 - Protect data from loss or modification	All	2
6.2 - Identify and access current official data for a specific use	FOTG, NRI, SSURGO	3
6.21 - Eliminate inconsistency	All	4
6.11 - Deliver data to meet specific needs	SSURGO, FOTG, Models	5
6.22 - Eliminate redundancy	All	6
6.3 - Identify and access previous versions of official data for a specific use	NRI, CRP	7
6.17 - Provide complete national coverage of data	National Program	8
6.6 - Access to Reporting and downloading Capability	All	9
6.12 - Create new interpretations from current or previous official data	National Programs	10
6.13 - Apply interpretive criteria to selected map units or geographic areas	LESA, National Programs	11
6.4 - Maintain, identify and access more than one set of official data for a geographic area	SSURGO STATSGO	12
6.16 - Provide data that can be used to create seamless spatial coverage	General	13
6.26 - Provide Metadata, detailed information or description of products and data provided to users	All	14
6.8 - Identify geographic areas where new data have been updated since some previous date	NRI	15
6.24 - Comply with Federal Geographic Data Committee (FGDC) Soil Geographic Data Standard	All	16
6.5 - Maintain, identify and provide access to soil survey supporting data for a geographic area	Tech Soil Services	17
6.14 - Provide selected attributes for any geographic area	Tech Soil Services	18
6.7 - Identify changes between versions of data released to users	General	19
6.18 - Notify data users when data have changed	General	20

6.10 - Deliver the most up-to-date data for specific uses	Tech Soil Services	21
6.27 - Integration with Other Resource Databases	All	22
6.25 - Provide access to the technical references, standards and guides for soil survey	All	23
6.9 - Identify changes between the most up-to-date data and official data	State Soil Scientist	24
6.19 - Notify Data Users of Product Plans and Progress	General	25
6.15 - Select data by any attribute without respect to geographic area	Tech Sers, National Programs	26